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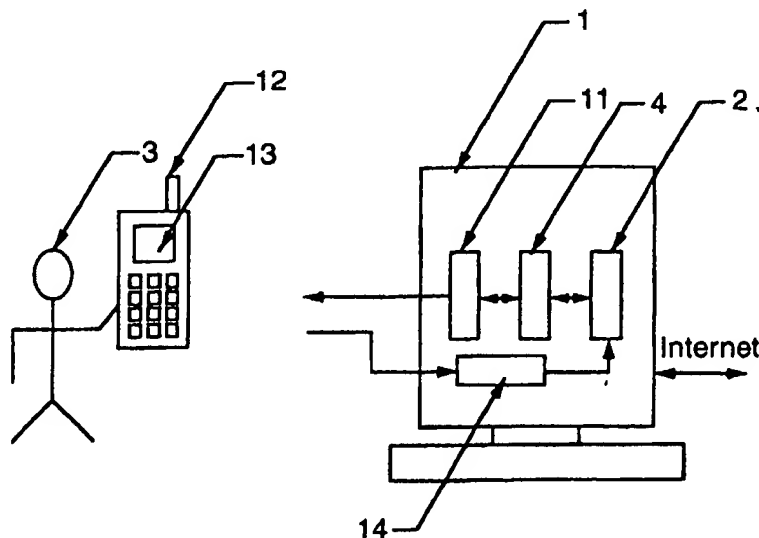
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(54) Title: PORTABLE HIGH SPEED INTERNET DEVICE COMPRISING INTERNAL MEMORY FOR ACCESSING PREVI-
OUSLY SEEN IMAGES AND USER-CAPABILITIES FOR MODIFYING A SEQUENCE OF DOWNLOADING



(57) Abstract: The invention discloses a portable device that allows the user to access the Internet and World Wide Web. By connecting wirelessly to a host computer, via a cellular telephone, the device receives bit map or raster images of the Internet and World Wide Web. The user is able to scroll to an area within the displayable area of the device, thereby initiating downloading in that area prior to downloading the rest of the image. The user is further able to click on an area of the displayable area to initiate downloading in that area prior to downloading the rest of the image. The device enables the user to view previously seen or accessed images or Web pages because the images and pages are stored in an internal memory. The device further receives data from the host computer in two procedures thereby providing the user with a partial image, and enabling the user to realize sooner the information contained in that portion of the image, and click on a link.

PORTABLE HIGH SPEED INTERNET DEVICE COMPRISING INTERNAL
MEMORY FOR ACCESSING PREVIOUSLY SEEN IMAGES AND USER-
CAPABILITIES FOR MODIFYING A SEQUENCE OF DOWNLOADING

5 Prior Art

The background of the present invention includes US Patent # 5925103, Internet Access Device, which describes an improved Internet access system, vastly different from the present invention. Other prior art would include palm top
10 computers, hand-held computers and cellular telephones that have limited processing power due to design restrictions. Thus, these computers are much slower for accessing the Internet and World Wide Web.

The present invention enhances the server's processing speed, data transfer and
15 retrieval to and from the portable devices, with the aid of specialized embedded software in the server. The result is a cost effective Internet access solution.

Summary

It is an object of the present invention to disclose a portable device, similar to a combination of a cellular telephone and palm top computer that can access the Internet and World Wide Web.

The present invention discloses a portable device that comprises a modem that connects to a cellular telephone. Thus, the device has a wireless connection to the Internet. A host computer, which may also be a Web server connects directly to the Internet. The host computer comprises multiple software programs, for example a Browser Translator, which translates HTML images into black and white bit map or raster images. The compressed bit map or raster images are sent to the portable device, and the device decompresses the images. Thus, the user views a bit map image of a Web page.

The portable device comprises methods for pointing and clicking on text and images representing links to other Web pages. Clicking events are sent to the host computer that performs the commands via a virtual browser. The host computer then sends the required information to the portable device as a compressed image. The portable device decompresses the image and the user views a new page.

It is a further object of the present invention to disclose a method of the user modifying the sequence of downloading images to the device. A user familiar with the layout of a Web page can scroll a specific area, before the information is downloaded, to initiate downloading in that area prior to other areas of the Web page being downloaded. The user can also click on an area of the displayable area of the device to initiate downloading in that area, prior to other areas being downloaded.

It is a further object of the present invention, to disclose an internal memory in the device whereby downloaded Web pages or images are stored, and the user is able to access these pages by clicking on a "back" or "forward" button.

It is another object of the present invention, to disclose a method of data transfer from the host computer to the device, whereby data is sent in multiple procedures. Thus, the user is able to view a partial image of a Web page sooner, and is able to realize the contents of the page and click on links sooner.

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DETAILED DESCRIPTION OF THE DRAWINGS

The invention is described in more detail below with respect to an illustrative embodiment shown in the accompanying drawings in which:

- 5 **FIGURE 1** illustrates a block diagram of the host computer, the portable device with wireless connection and the user.

FIGURE 2 illustrates portions of the image with respect to the displayable area.

FIGURE 3 illustrates sub-divisions of the image to be displayed.

- 10 **FIGURE 4** illustrates the portable device, the direct server and the host server.

FIGURE 5 illustrates an enlarged view of the device and the image

FIGURE 6 illustrates an enlarged view of the device and the image and scroll bars

FIGURE 7 illustrates an enlarged view of the device and the image with an area to be clicked

- 15 **FIGURE 8** shows the normal sequence of downloading

FIGURE 9 shows the altered sequence of downloading

FIGURE 10 displays the "back" and "forward" buttons

FIGURE 11 illustrates a sequence of downloading an image line by line

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DETAILED DESCRIPTION OF THE PRESENT INVENTION

The principal embodiment of the present invention aims to provide a device that allows a user to access the Internet or the World Wide Web (WWW), which device
5 is similar to a palm top computer. It is a further aim of the present invention, to reduce the cost of the device. It is a further aim of the present invention, is to increase the speed of refreshing the screen when the user clicks on a link and commands another page to be displayed.

10 Currently, existing palm top devices such as the Palm Pilot VII and Windows CE type devices contain an operating system, and within the operating system a mini-browser to interpret information received from the WWW or Internet and then display this information on the screen. This requires a powerful microprocessor.

15 With reference to applications 09/496,172, 09/501,585, 09/504,809, 09/504,808 and 09/504,807 which embodiments are incorporated herein, the present invention discloses a method and system of storing previously viewed pages on the device. Thus, a user is able to utilize a pointer to select and press a "back" button or a "forward" button to view previously accessed pages, and which pages
20 are stored directly in the device. The invention further discloses a method of enabling the user to scroll to a specific area thereby initiating downloading in that area, or the user clicking on a specific area to initiate the downloading.

The principal embodiment of the present invention is disclosed in **Figure 1**. A
25 host computer 1 is depicted that is connected to the Internet and may also be a Web server. Running in the host computer, is a Web server program 2. When a remote user 3 requests to view a Web page (or electronic message etc.) the Web server software receives HTML, JAVA, etc. information from the World Wide Web and transmits this information to another software, the Browser Translator 4. This
30 software translates the information, (i.e. the entire image comprising graphics and text) received in the form of HTML, Java, etc. (information may be gathered from different sources) and translates it to a black and white bit map or raster image. In another embodiment, the software translates the information into a raster color

image. The image 5, as shown in Figure 2, contains the information that would normally be displayed on a single Web page. The translation program therefore, also acts as a virtual browser 6. As can be seen in Figure 2, the image 5 to be displayed in a browser window 6 is usually larger than the displayable area of the browser window 6.

The image 5 is further divided into sections 7, 8, 9, and 10, as shown in Figure 3. The image is divided after the bitmap or raster is created. The reason for the division (as will be explained later) is for the purpose of display priority on the user's display. The image 5 is then sent to another program 11 running on the host computer 1 (Fig. 1), which compresses the image using a loss-less compression method. The compression method may be group 3 or group 4, or another method.

The programs 4 and 11 can have multiple instances running simultaneously on the host server for the purpose of connecting to multiple users. The compressed image, after being processed by program 11, is sent to the user, using a protocol in which information may be broken down into packets.

The information is received by a palm top device 12 that has the ability to display a monochrome image, in its display window 13. The information is decompressed and displayed in the order of priority such that part of image 7, which substantially or completely covers the displayable area 13 (Fig. 2), of the palm device is decompressed and displayed first and then sequentially the portions 8, 9, 10 of the image are decompressed and stored in an internal memory of the palm top device to be displayed later when the user scrolls up, down, or sideways to these parts of the image.

Figure 5 is an enlarged view of the displayable area 13 of the device 12 and the image 5. The host computer transmits the compressed image to the device via the user's cellular telephone. The information is received by the device, which has the ability to display a monochrome image, in its display window. In this embodiment, the virtual browser window is of equal size to the displayable area of the device. The information received by the device is decompressed and

displayed in the order of priority, as shown numerically in **Figure 5**. The image is displayed such that part **D** of image, which is decompressed and displayed first completely covers the displayable area **13**, of the device and then sequentially the other portions of the image are decompressed and stored in an internal memory of the device to be displayed later when the user scrolls up, down, or sideways to these parts of the image.

The principle embodiment of the present invention discloses a method for the user to alter the predetermined sequence of downloading of a requested Web page or image. The user can scroll to an area on the display of the device, thereby altering the sequence of downloading such that the scrolled-to area will be downloaded first, followed by the surrounding area, until the entire image has been transmitted to the device.

After having viewed a Web page multiple times, the user will be familiar with the layout of the Web page. Therefore, the user knows an approximate location on the displayable area of the device of essential information or links with which the user is most concerned,

For example, **Figure 6** illustrates numerically the predetermined sequence of downloading for a specific Web page. The device **12** and displayable area **13** are shown. Thus, area **A** is the first portion of the web page to be transmitted to the device. However, the user is ultimately interested with information located at area **B** and accordingly knows that this information is accessible by clicking twice, with the pointer, on conventional scroll bars **18** bordering the display. Thus, to obtain this information first, the user can scroll until the appropriate area **B** has been advanced. Thus, the sequence of downloading and to initiate downloading in the scrolled-to area. The scroll bars enable the user to scroll faster than the downloading process.

The device sends a message to the host computer conveying the location of the scrolled-to area on the device. A program interprets the received message and provides a virtual scrolling procedure to the same location in the virtual browser. The translator program, in the virtual browser, subsequently begins translating the

information in the scrolled-to area into a bit map or raster image, which image is consequently compressed by the compression program and then dispatched to the device where the required information is displayed first.

5 Thus, the sequence of downloading is modified according to the needs or preferences of the user. The user can scroll, horizontally or vertically, to any area of the image to activate downloading in that area first. Furthermore, the surrounding areas of the scrolled-to area will be subsequently downloaded because of the likelihood of the user requiring this data sooner than information
10 located on other areas of the page. The entire page will be eventually downloaded, however the order of downloading is modified.

In another embodiment of the present invention, while information is being downloaded into the device, the user can click in a specific area on the
15 displayable area of the device, to modify the order of downloading such that the information located at the clicked-on area will be downloaded first.

As explained in the previous embodiment, the user can scroll to a preferred area to begin downloading that area first. However, with reference to **Figure 7**, the
20 user can use the pointer to click on a specific area of the displayable area 13 of the device 12 to specify that this portion of the image is to be downloaded first.

For example, the user knows that essential links are located in area C of the displayable area of the device 12. Thus, the user can use the pointer to click
25 upon the appropriate location C in the displayable area 13. The device sends a message to the host computer conveying the location of the click down event on the image of the device. A program interprets the message and provides and the translator program subsequently begins translating the information from the new location, into a bit map or raster image. The image is compressed by the
30 compression program and subsequently dispatched to the device where the required information is displayed first.

Thus, the predetermined sequence of downloading is modified, according to the needs or preferences of the user. **Figure 8** is an enlarged view and illustrates

numerically a usual sequence of downloading leading to the area C. **Figure 9** is an enlarged view of the clicked-on area C of **Figure 7**. **Figure 9** further shows a potential sequence of downloading subsequent to the user clicking on the specific area. The immediate surrounding areas of the clicked-on area will be downloaded accordingly. The remaining parts of the page are transmitted, until the entire page has been sent from the host server.

Thus, the user is able to establish a precise location where downloading is to be activated first, according to the user's preferences.

10

A CPU resident in the palm top device therefore has the ability to decompress a bit map or raster image that may be larger than the size of the display and allow the user to traverse this bit map or raster image. The primary method of traversing the image is through conventional scroll bars positioned at the sides of the image.

15

The resident CPU on the palm top device has no ability to determine which parts part or parts of the image, that is being displayed, represent links to other Web pages etc. Thus, the translator program 4 (**Fig. 1**) translates the image in the virtual browser 6 such that the words that represent links on the page 5 (**Fig. 2**) are translated to be slightly bolder. The user may therefore consider text that is bold to be links.

20

The palm top device provides the user with a pointing device. This pointing device may be a touch screen or tracking ball, etc. The palm top device also allows the user to click on specified areas. As soon as the user clicks on part of an image, the shape of the pointer changes from an arrow to an hourglass. A message is sent to the host computer, transmitting the location of the clicked down event. A program 14 interprets the message and provides a virtual click down in the virtual browser created in the translator program 4. If the user has pressed in an area of the image that does not represent a link or text box, a message is dispatched to the palm top device which immediately changes the hourglass shape of the pointer back to an arrow (In the case of a touch screen, from an hour glass to nothing). Further to this, if the user has clicked on a part of

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the image which represents a link, a new Web page is extracted from the Internet or WWW, translated by translator program 4 (Fig 1) into a bit map or raster, and compressed by compression program 11 and dispatched to the palm top device where a new page is displayed. Furthermore, the image 5 is continuously being
5 updated and translated and sent to the palm top device where it is continuously being refreshed. This occurs once every few seconds.

In another embodiment of the present invention, the user may save and store the rasterized Web pages in the memory of the device, and therefore be able to view
10 offline the stored rasterized pages, at a later time. The advantage of this embodiment is that the user does not have to connect to the host server to view the saved Web pages.

In another embodiment of the present invention, reference is made to Figure 10
15 where displayable area 13 of the device 12 is illustrated. "Back" button 20 and "forward" button 21 provide the user the means of viewing previously accessed or seen pages, with respect to the user's currently displayed page. The user can utilize the pointing device, to select and click upon the "back" button and "forward" button to view the previously seen pages, which pages are stored in an internal
20 memory in the device because the pages were previously downloaded. Thus, as soon as the user clicks on the "back" button the device displays the requested page immediately because the page is stored in the device. Thus, retrieving previously seen pages is faster and more efficient for the user.

25 The device also sends a message to the host computer that a click down event has occurred on the display of the device. A program interprets the received message and executes a virtual clicking or pressing of a "back" button in the virtual browser and the page in the virtual browser is changed. Thus, the image on the display of the device and the image of the virtual browser are logged onto
30 identical pages. However, the host server does not transmit the page again because the host server detects that the page is currently displayed on the device. The device and the virtual browser must always be on the same page in order for any command executed by the user on the device, such as selecting a link, be executed properly in the virtual browser.

The same operation would occur if the user were to select and click upon the "forward" button.

- 5 In another embodiment of the present invention, the host server sends the compressed data to the device in a sequence of every second line of data, which sequence is repeated until all of the compressed data has been sent.

10 **Figure 11** illustrates numerically a conventional method of data transfer from the host computer to the device 12. The compressed bit map or raster image is sent consecutively, line by line, until the entire image has been sent to the device. The displayable area of the device has a resolution of 320 x 240 pixels and the time to completely fill the displayable area of the device with a portion of the image is approximately six seconds.

15

- In the present embodiment, the data transfer from the host computer to the device is such that the compressed data is sent by every second line for example, line 2, line 4, line 6 etc. The procedure is then repeated with line 1, line 3, line 5 etc. until the entire displayable area of the device is covered by a portion of the image.
- 20 Thus, the transfer of data is divided into two procedures, with each procedure taking approximately three seconds. The total amount of time to fill the displayable area remains six seconds.

- The transmission of the compressed data by such a method enables the user to
- 25 view a partial image sooner, and which partial image may be enough information for the user to discern what that portion of the image represents. Thus, the user may be able to realize sooner the information that is represented or select and click a link, in that portion of the image.

- 30 When the user clicks in a text box or in a box in the display area into which letters or numbers must be input, the cursor first changes into an hourglass, and a message is sent to the host server. The host server recognizes that the click down event has occurred in the text box, and sends a message back to the palm top device to inform the palm top device to pop-up a keyboard on part of the

screen. The user then types, using the pointer, the letters or words to be entered into the text box and presses "enter" or "go". The keyboard then disappears and the cursor changes back to an hourglass shape (in another embodiment, the keyboard could be replaced with a real keyboard or with an area that recognizes users' handwriting). The information typed into the text box is transmitted in a message to the host computer. The host computer enters the information into a text box in the virtual browser.

The user sees, after a short pause, as the image is refreshed on the palm top device, that the words, or letters or numbers have been entered into the text box. Further to this, the host computer may also break up the image such that the portion that has been changed, i.e. the text box area, is sent first.

In another embodiment of the present invention, images are only refreshed when as event occurs such as a mouse down event on a link or in a text box.

In a further embodiment only those portions of the image that changes may be transmitted from the host computer to the palm top device. Other images in the virtual browser that are continuously changing, such as banner advertisements, may be the only other images sent to the palm top computer as they change.

In the principal embodiment, the palm top device also contains a modem, which can be linked to the user's mobile telephone and information that is communicated between the palm top device and the host computer is sent and received wirelessly through the mobile telephone.

Furthermore, the palm top device only contains enough memory to store the current displayable page. When the user presses a back or forward button, a message is sent to the host server, and the host server sends the reference page. The back and forward buttons etc. may be hard wired into the palm top device, or may be part of the display area.

Further to this, part of the image representing buttons (and other things) on the virtual browser may be sent as part of the compressed image and buttons such as

forward and back may be treated the same way as links are handled as previously described.

5 In another embodiment, the palm top device comprises a modem that permits the device to connect to a cellular telephone 15 in digital format.

In another embodiment, the connection to the cellular telephone 15 is made through an analog modem connected to an ear jack of the cellular telephone.

10 In yet another embodiment of the present invention, the modem is replaced by an analog modem that has the capability to be connected to a landline providing a standard 56kbps-type connection.

15 Further embodiments may provide connections through ISDN, cable modems etc.

In a further embodiment, the palm top device may contain a large screen to be used in a fashion similar to a home Internet appliance.

20 In a further embodiment, the image transferred between the host computer and the remote device (previously the palm top device) may be a color image and the compression method used may be of a Jpeg or other compression methods used for color images. A gray scale image may also be used to reduce bandwidth or display costs.

25 In a further embodiment, the device includes no screen, but only outputs to be hooked to a television screen or external monitor for display.

30 The remote device in the principal embodiment only has the ability to decompress the image it receives; display the image it receives; allow the user to scroll through the image; provide the user with a pointing device to point and click on the image; send messages providing location of click down event; provide the user with a method to input letters and numbers; send a message containing these letters and numbers.

The principal embodiment contains no other structured or intelligent information about the image.

5 The invention has been described in detail with particular reference to the preferred embodiments thereof, but it will be understood that variations and modifications can be effected within the spirit and scope of the invention.

CLAIMS

What is claimed:

- 5 1. A virtual browser comprised within a host computer, which virtual browser scrolls in unison to a scrolling procedure executed by a user on a remote portable device.
- 10 2. A device that enables a user to alter a sequence of downloading of sections of an Internet image from a host computer to said device, comprising;
the user scrolling to an area that has not been downloaded,
thereby
15 changing priority of download.
- 20 3. A device that enables a user to alter a sequence of downloading of a section of an Internet image from a host computer to said device, comprising;
the user clicking on an area of the section thereby changing the
sequence of downloading.
- 25 4. A device that enables a user to view previously seen or accessed images or pages on the World Wide Web, by pressing a "back" or a "forward" button to view immediately said images or pages because said images or pages are stored in an internal memory in said device, as a raster compressed images.
- 30 5. The host computer transmits continuously partial data to the device thereby providing a partial image on a displayable area of the device thus enabling the user to discern a complete image from the partial image.

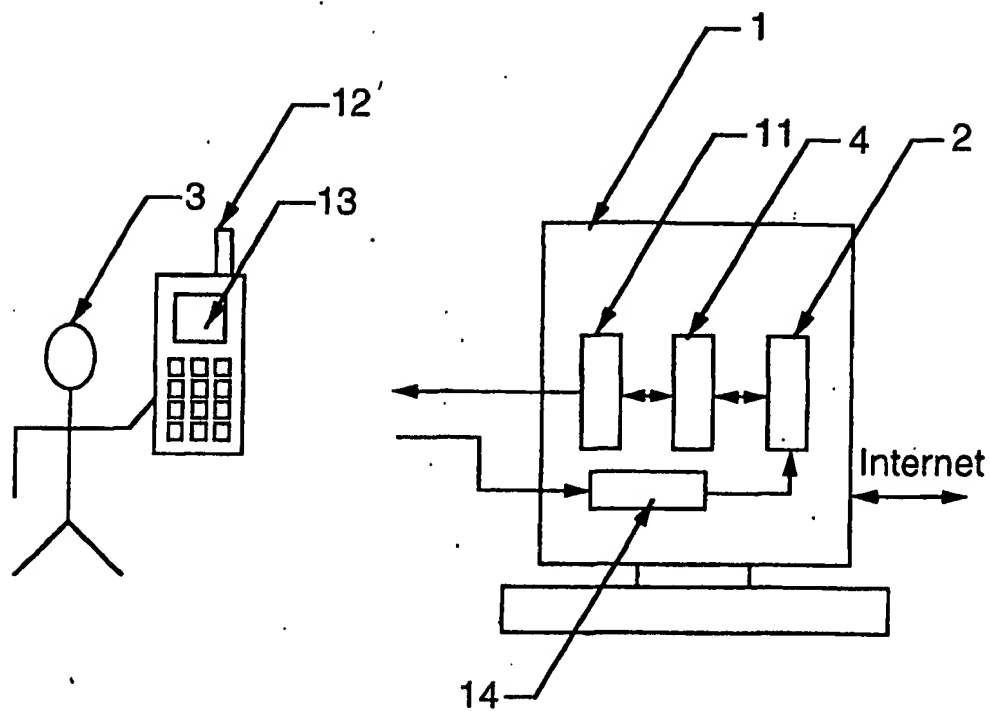


Fig. 1

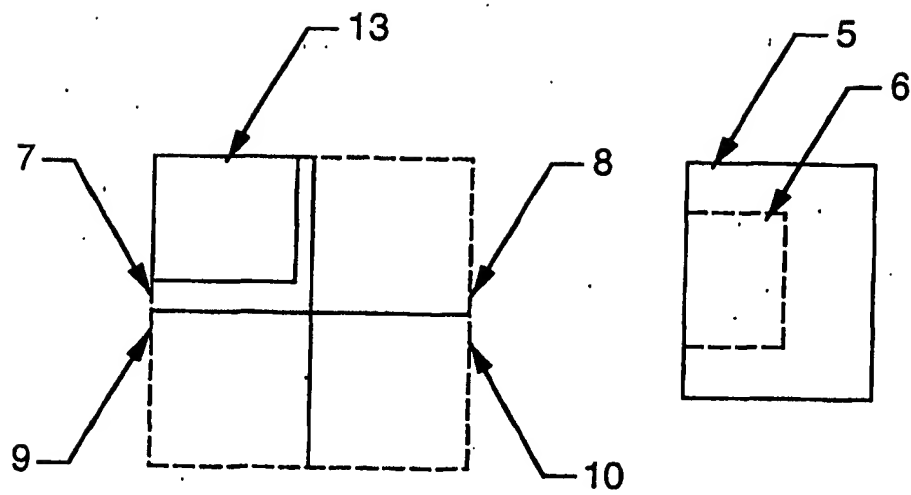


Fig. 2

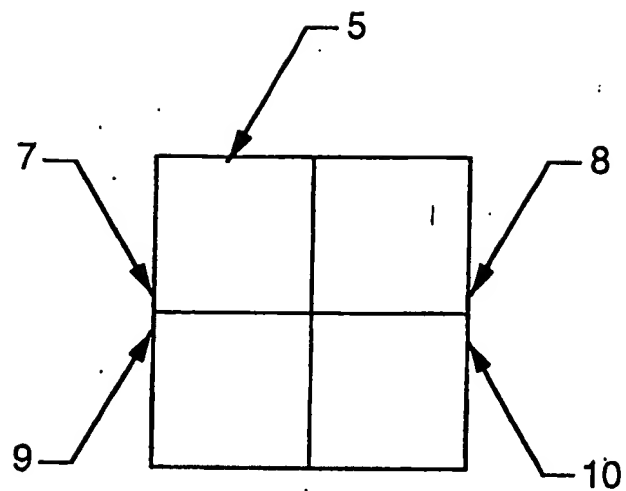


Fig. 3

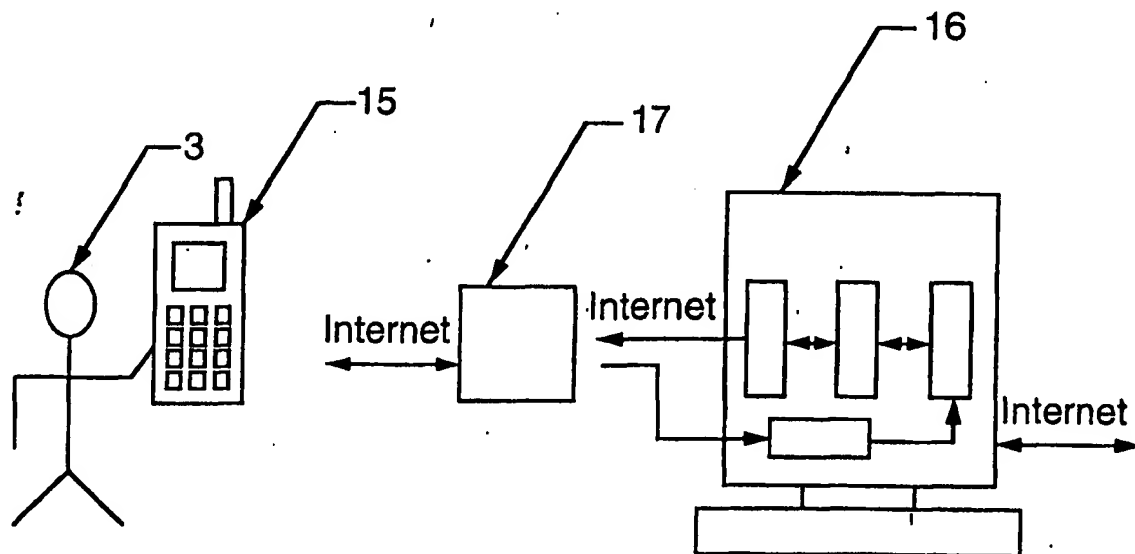


Fig. 4

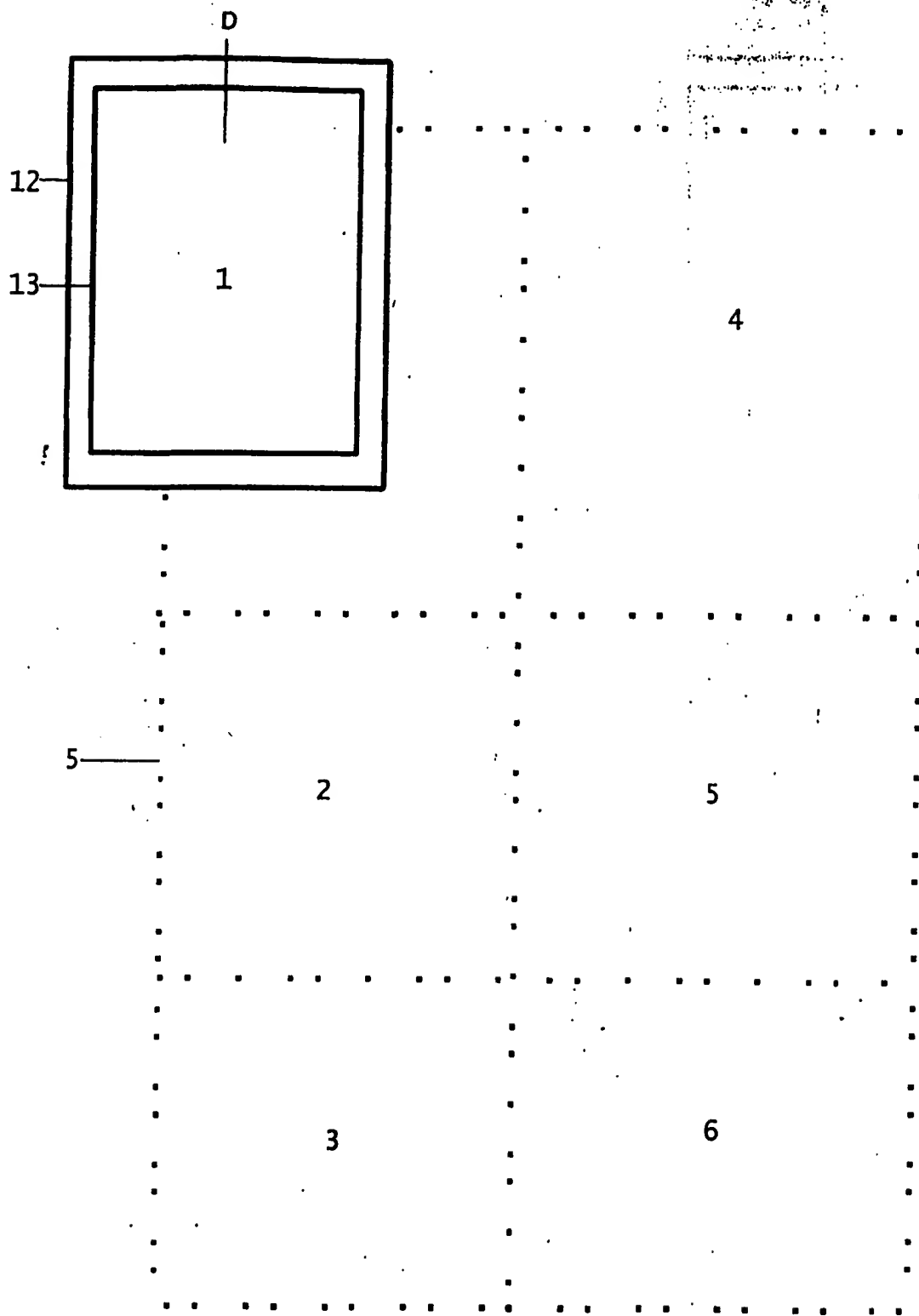


Figure 5

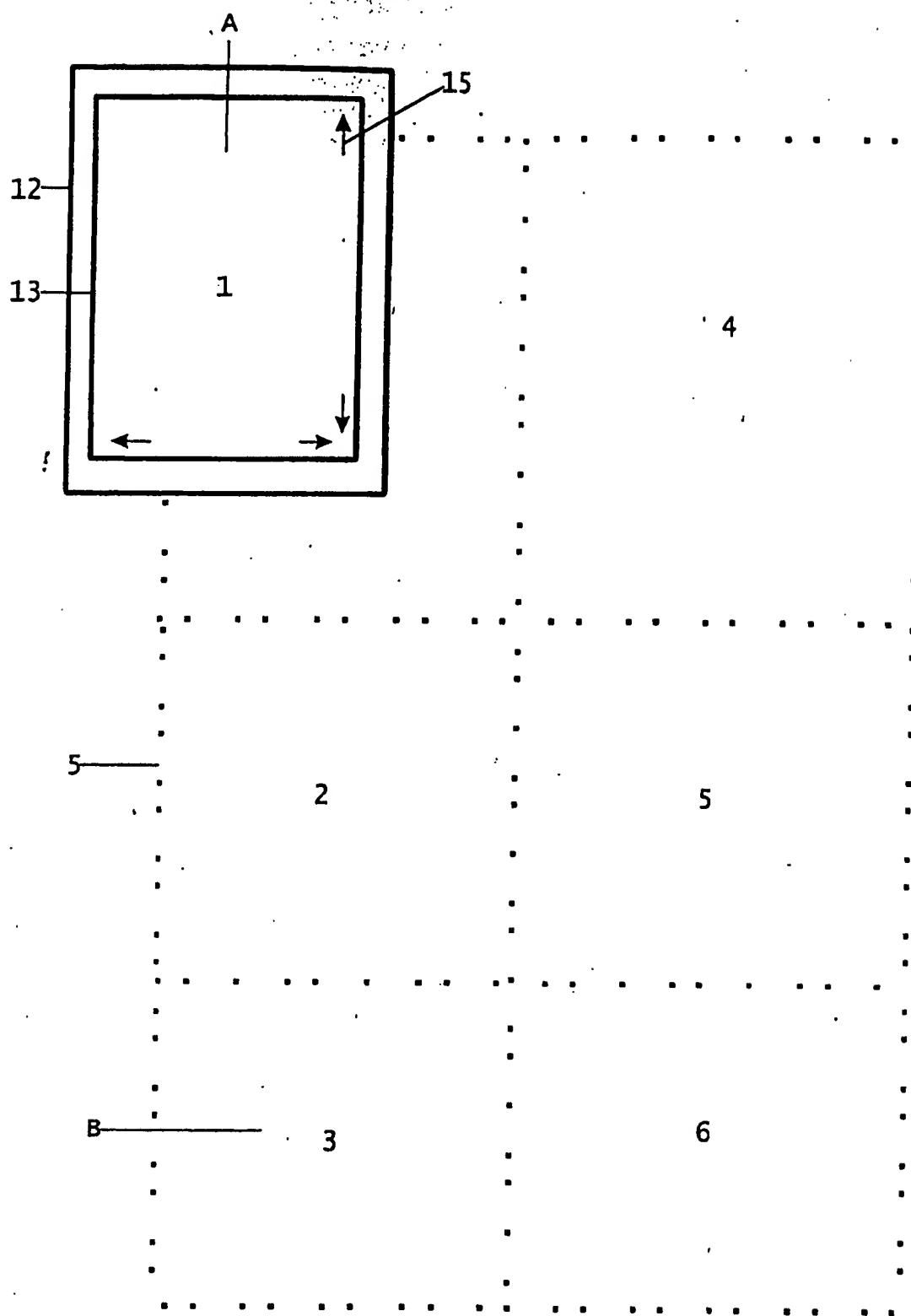


Figure 6

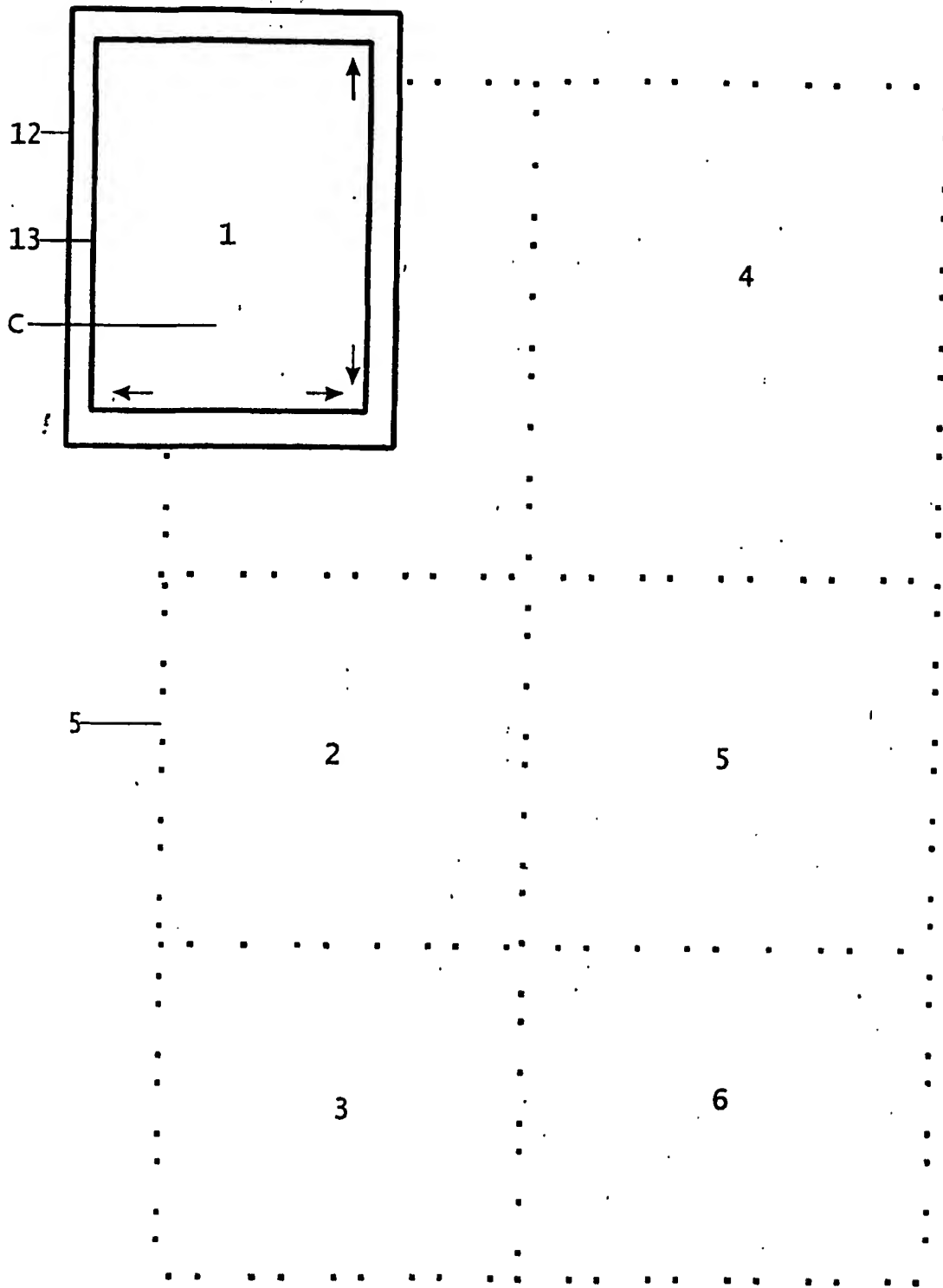


Figure 7

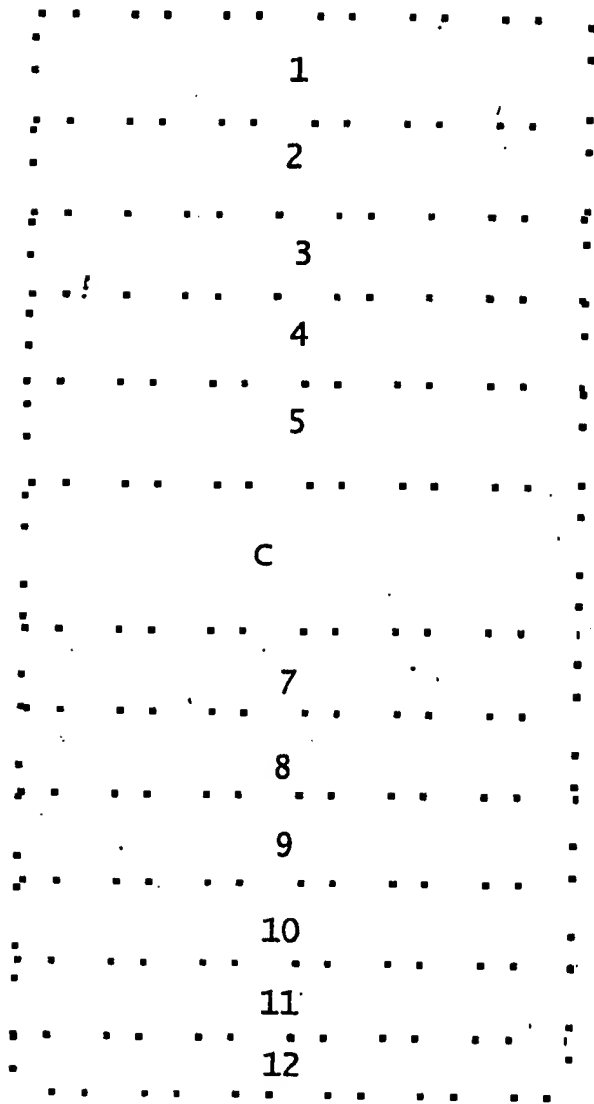


Figure 8

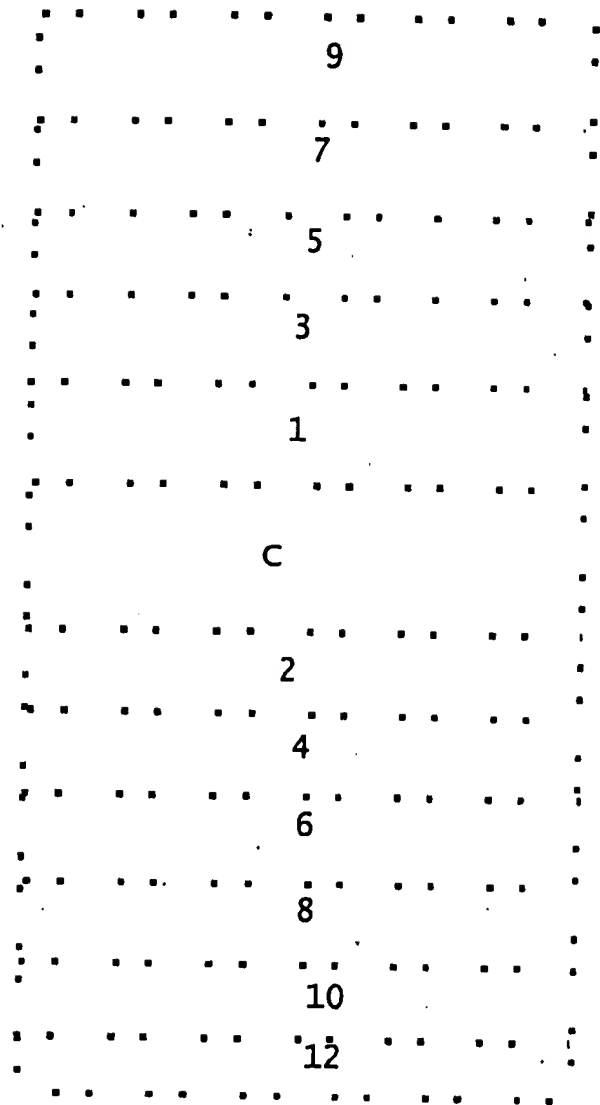


Figure 9

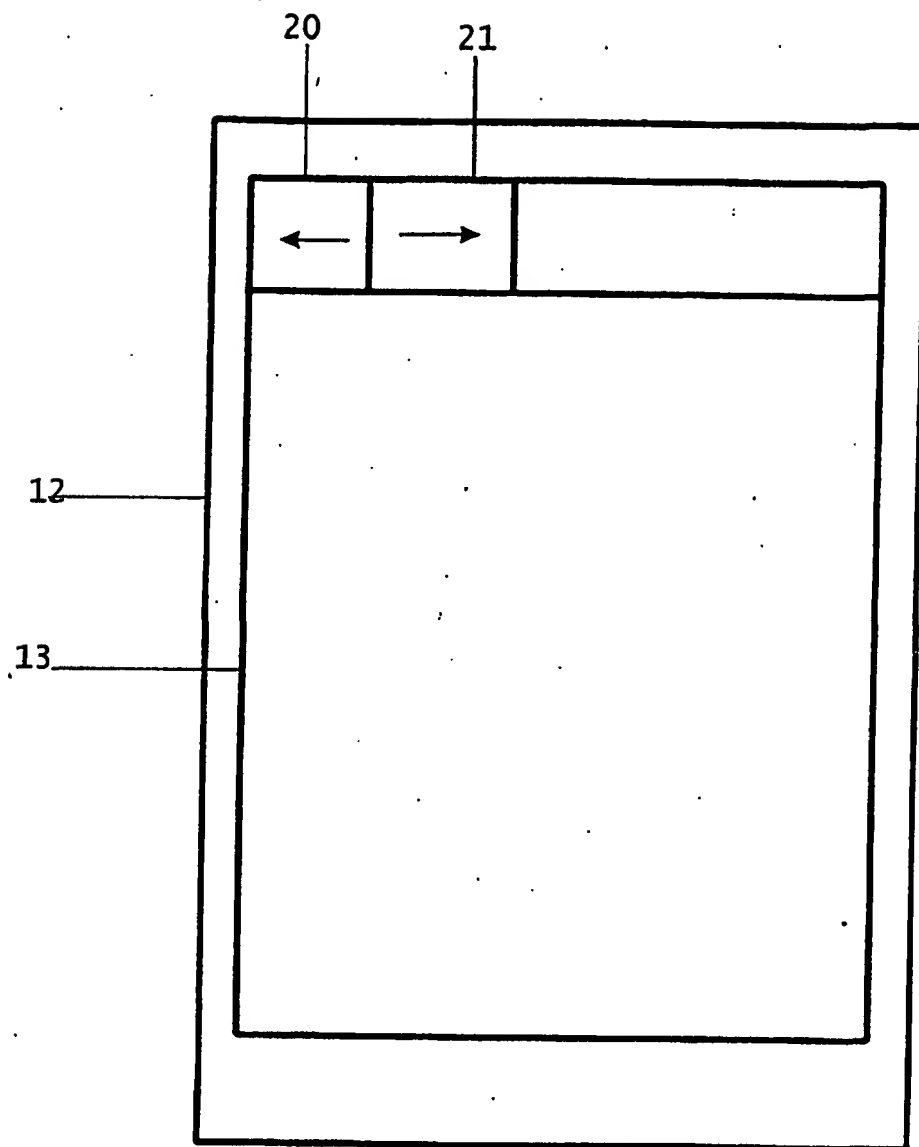


Figure 10

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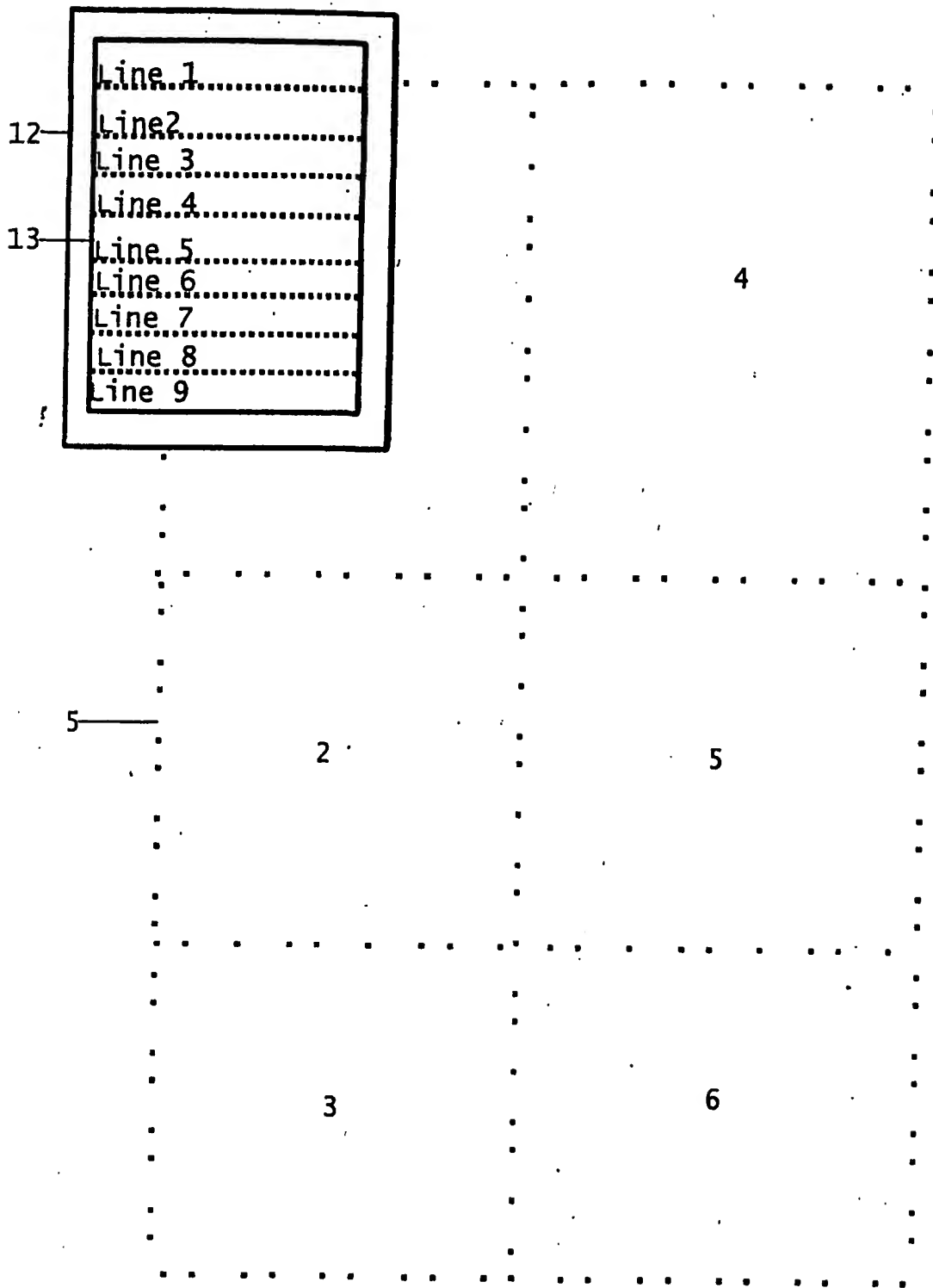


Figure 11